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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,161	07/26/2002	Jussi Tenhunen	3501-1007	9798

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EXAMINER	
GEISEL, KARA E	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,161	TENHUNEN ET AL.	
	Examiner	Art Unit	
	Kara E Geisel	2877	

-- The MAILING DATE of this communication appears on the cover sh et with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 July 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0602*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Preliminary Amendment

The preliminary amendment filed on March 27th, 2002, has been entered into this application.

Information Disclosure Statement

The information disclosure statement filed on June 14th, 2002 has been fully considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 1, 4, 10-12, 19, and 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the exit slit" in lines 31-32. There is insufficient antecedent basis for this limitation in the claim.

Claims 4, 10-12, 19, and 28 recite the limitation "the sample" in line 2. There is insufficient antecedent basis for this limitation in these claims.

Claims 26-27 recite the limitation "the sample" in line 3. There is insufficient antecedent basis for this limitation in these claims.

Claims, which are dependent from claims 4, 10-12, 19, and 26-28 inherit the problems of these claims, and are, therefore also rejected under 35 U.S.C. 112, second paragraph.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3-13, 15-16, 18-24, 26-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (USPN 5,631,735), as cited by applicant, in view of Gautherin et al. (USPN 5,114,231).

In regards to claims 1 and 16, Nagai discloses a method of measuring optical radiation with a spectrometer and the spectrometer for measuring the optical radiation comprising illuminating an entrance slit (fig. 6, 2) of the spectrometer with optical radiation, imaging the entrance slit to an optical modulator (fig. 6, 60), dispersing the entrance slit image into a spectrum with a dispersive component (fig. 6, 4), modulating the spectrum with the optical modulator, the spectrum being composed into a measurement signal with the dispersive element, and measuring the measurement signal by the spectrometer, characterized by imaging the entrance slit to an optical modulator (fig. 6, 60), which comprises modulating elements (fig. 5C, 67), dispersing the entrance slit image into a spectrum with the dispersive component (fig. 6, 60) so that each wavelength of the spectrum forms an image of its own from the entrance slit (column 5, lines 17-23), the place of the image on the elements of the optical modulator (108, 210, 238, 318, 406, 510, 604) depending on the wavelength (column 5, lines 21-37), modulating the

dispersed entrance slit image with at least one element of the optical modulator (column 8, lines 19-26), in which case at least one wavelength band modulated from the entrance slit image is formed (column 3, lines 1-8), directing at least one modulated wavelength band to the dispersive component which composes non-dispersive measurement radiation from at least one modulated wavelength band to that the entrance slit mage at each wavelength band is formed in the same place regardless of the wavelength (column 15, lines 28-37), imaging by means of the non-dispersive measurement radiation the entrance slit to an exit slit (fig. 6, 12), which is different from the entrance slit, and detecting for spectrum measurement, the measurement radiation obtained from the exit slit with one detector (fig. 6, 12), which converts the measurement radiation into an electrical measurement signal, and demodulating the electrical measurement signal to separate signal components formed by different wavelength bands from the another and measuring at least one wavelength band with at least one signal component (column 3, lines 1-8, and column 8, lines 41-55). Nagai does not disclose a first or second mirror for reflecting radiation from the dispersive component to the optical modulator and for reflecting radiation from the modulator to the exit slit. However, it is disclosed that a lens is used (fig. 6, 5) for the dual purpose of focusing radiation from the diffraction grating to the modulator so that slit images will form on respective elements of the modulator according to wavelength (column 15, lines 31-33), and to focus the modulated radiation from the modulator to the diffraction grating and then to the exit slit. These functions can be done with two different elements (as shown in fig. 19), and it would be obvious to one of ordinary skill to do this to allow more flexibility in design of the spectrometer. Furthermore, it is very well known to replace lenses with mirrors of the same property, depending on the availability of each element, and to allow for more flexibility in design of the spectrometer.

For example, Gautherin discloses a spectrometer wherein the lens of the system can be split into multiple lenses that serve the same function as the single lens (column 4, lines 12-19), and the two lenses of the system can be replaced with mirrors that have the same combined focal length (column 5, lines 16-

32), as alternate embodiments of the spectrometer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the one lens of Nagai's spectrometer with two mirrors, the first mirror functioning to focus radiation from the diffraction grating to the modulator so that slit images will form on respective elements of the modulator according to wavelength, the second mirror functioning to focus the modulated radiation from the modulator to the diffraction grating and then to the exit slit in order to allow for more flexibility in the design and arrangement of the spectrometer.

In regards to claims 3 and 18, the entrance slit is illuminated with optical radiation emitted by a sample (Nagai column 5, lines 6-10).

In regards to claims 4 and 19, the combined system discloses imaging the entrance slit to the exit slit by means of the measurement radiation emitted by a sample (Nagai column 5, lines 6-10). While the combined system does not directly disclose illuminating the sample, it is very well known in the art to illuminate a sample in order to cause the sample to emit light of it's own (fluorescence), and it would be obvious to one of ordinary skill to do this, if the sample needed light in order to fluoresce.

In regards to claims 5 and 20, the combined system is characterized by modulating optical properties of the elements of the optical modulator as a function of time by modulating different wavelength bands with different waveforms and separating different wavelength bands form one another during measurement by demodulation corresponding to the modulation (columns 2-3, lines 60-67 and 1-8, respectively).

In regards to claims 6-8 and 21-23, it would be merely a design consideration and up to the user to determine which type of modulation to use for the optical modulator, and would be obvious to one of ordinary skill in the art, depending on the user's needs, and processing capability of the processor.

In regards to claims 9 and 24, only one dispersive component is used in the measurement (Nagai fig. 6, 4).

In regards to claims 10-12 and 26-28, it would be up to the user to determine what measurements to use the spectrometer for.

In regards to claims 13 and 29, the detector forms the exit slit (Nagai fig. 6, 12).

In regards to claims 15 and 31, the Examiner notes that the claim limitation "produced using a plane waveguide, LIGA technique and molded plastic optics" is drawn to a process of manufacturing, which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Claims 2 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (USPN 5,631,735), as cited by applicant, in view of Gautherin et al. (USPN 5,114,231), as applied to claims 1, 3-13, 15-16, 18-24, 26-29 and 31 above, and further in view of Stafford et al. (USPN 5,504,575), as cited by applicant.

In regards to claims 2 and 17, the combined spectrometer for measuring an optical spectrum is disclosed above. It is not disclosed that the optical modulator is an optical DMD modulator.

Stafford discloses a spectrometer comprising an entrance slit (fig. 2, 40), a dispersive component for dispersing the image of the entrance slit into a spectrum (fig. 2, 44), an optical modulator to modulate the spectrum (fig. 2, 46), and a detector for detecting a measurement signal produced from the modulated spectrum (fig. 2, 50). The optical modulator is an optical DMD modulator (column 3, lines 62-65), which is used over other types of light modulators because of the small size of it's elements, which allows the user to select smaller portions of the radiation for measurement by the detector (column 5, lines 35-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the optical modulator of the combined device with a DMD modulator in order to be able to select more accurately the portions of radiation that are measured.

Claims 14, 25, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (USPN 5,631,735), as cited by applicant, in view of Gautherin et al. (USPN 5,114,231), as applied to claims 1, 3-13, 15-16, 18-24, 26-29 and 31 above, and further in view of Gourley et al. (USPN 5,608,519).

In regards to claims 14, 25, and 30, the combined spectrometer for measuring an optical spectrum is disclosed above. It is not disclosed that the spectrometer is on an integrated circuit.

Gourley discloses a spectrometer for measuring an optical spectrum. Gourley discloses that an alternate embodiment to a stand-alone spectrometer, such as the combined spectrometer disclosed above, is a spectrometer on an integrated circuit (column 9, lines 8-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place the combined spectrometer on an integrated circuit as an alternate embodiment.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art made of record is Winter (USPN 3,915,571), Fateley et al. (USPN 4,856,897), and Lindberg et al. (USPN 5,748,308).

Winter discloses a monochromator comprising an entrance slit, a dispersing element for dispersing images of the entrance slit according to wavelength, a first mirror for directing the dispersed images to a modulator, a modulator for modulating the dispersed image, a second mirror for directing the modulated image to a second diffraction grating and an exit slit.

Fateley discloses a spectrometer for measuring optical radiation comprising a light source for illuminating a sample, an entrance slit to receive light from the sample, a grating to disperse images of the entrance slit according to wavelength, a first mirror for directing the dispersed images to a modulator, a modulator comprising modulating elements for modulating the dispersed images, a second mirror for reflecting the modulated images to an exit slit, a second dispersive component to recombine the images

and direct the combined image to the same place regardless of wavelength, one detector for detecting the combined image, and a processor for demodulating a signal from the detector to separate signal components from by different wavelength bands from one another and to measure at least one wavelength band with at least one signal component.

Lindberg discloses a spectrometer for measuring optical radiation comprising a light source for illuminating a sample, an entrance slit to receive light from the sample, a grating to disperse images of the entrance slit according to wavelength, a first mirror for directing the dispersed images to a modulator, a modulator comprising modulating elements for modulating the dispersed images, a second mirror for reflecting the modulated images to an exit slit, and a second dispersive component to recombine the images and direct the combined image to the same place regardless of wavelength.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is **571 272 2416**. The examiner can normally be reached on Monday through Friday, 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on **571 272 2415**. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9306 for regular communications and 703 872 9306 for After Final communications. For inquiries of a general nature, the Customer Service fax number is 703 872 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 1782.

F.L. Evans
Primary Examiner
Art Unit 2877

K.G.

KEG
May 5, 2004